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THE SELECTION AND TESTING OF PHOTOGRAPHIC LENSES.

BY ELLERSLIE WALLACE.

IT is to be regretted that out of the great army of people who purchase photographic outfits, comparatively few know anything about lenses, or the proper methods of subjecting them to tests of their fitness for work.

And it is hardly less to be regretted that many authorities upon photographic optics, and matters connected with the subject of lenses, couch their instructions in such contradictory and obscure language that they amount to nothing. It has lately become the fashion for some photographic writers to complicate simple matters as much as they can, and especially in things concerning lenses or optics, to make showy but useless displays of mathematical learning in the form of tables and equations.

The average amateur who buys an outfit will generally obtain a lens answering its purpose fairly well. Suppose now that it were desired to subject the lens to somewhat of strict photographic scrutiny; how should he go about it? Naturally he would ask himself the question what special kind of work he wanted the lens to do—or rather, perhaps, how many sorts of work he could force the lens into performing. This being settled, and suppose that landscape photography was chosen as the work to be done, the lens should be tested somewhat as follows: having removed all the stops capable of being removed, the camera should be directed towards a well-lighted subject, lying

pretty much in a single plane, such as the side of a village street with houses and trees, or the side of a country house with plants and shrubbery, or in default of anything better, the side of a city street with the house-fronts and trees, telegraphic poles, or lamp-posts, on the sidewalk. Focus the lens on some small prominent object exactly in the middle of the ground-glass, and then insert the smallest stop supplied with the lens. Expose and develop a plate. Now, remove the small stop and insert a large one; expose and develop another plate, and then compare the results. Examine carefully the marginal positions of the plates first, and note how much the image in these places has lost the crisp definition seen in the centre. Note also how far outwards from the centre the good definition extends. If the plates made with the small stop shows pretty good sharpness all over, while that with the large one is good for nothing a couple of inches or so from the centre, the lens would not be entitled to rank as a particularly good one. So much for the flatness of field of the lens. But a landscape instrument must also be tested in other ways.

When we spoke above of a well-lighted subject for the trial, we had in mind the ordinary sun-lighted subject, presenting its southern side to the camera. It will now be necessary to hunt up another view or subject where the lens, instead of being directed *with* the light, shall be *against* it, so that the shaded sides of the various objects in the view may be photographed. Assuming the tests as above given for flatness of field to have proved satisfactory, a sharp lookout must be kept, when the camera is thus reversed, to see that the central part of the plate is perfectly clear, brilliant, and free from a round foggy spot about the size of a quarter-dollar. This is often seen in lenses of inferior construction, and is known as the "flare" or "ghost." If this is observed either on the ground-glass or the developed plate, the lens should be condemned and returned to the makers as worthless. Some of the most charming effects in landscape photography are obtained by working against the light, but if the lens has any tendency to the "flare" of course nothing of the kind can be attempted. We cannot too strongly insist upon a rigid examination of the lens in this regard.

Still another point requires attention, and it may be combined with the trial for flare. This is the trial for "reach" or depth of focus. If the subject admit of it, focus on a comparatively near portion of the view—something, say, one hundred and fifty, eighty, or thirty feet away, and see what crispness of definition can be retained in the more distant parts of the view, as well as in the foreground, with a small stop. Then try again with a larger stop, and compare the results, not forgetting to search for even the faintest indications of flare. Another trial yet may be made, reversing this and focusing on the extreme distance, leaving the foreground to take care of itself. It is fair to say in this connection, that the sun should never be allowed to shine directly upon or into the lens. It will rarely or never be necessary in landscape work to direct the lens right into the sun's teeth, so to speak; nevertheless, a good lens ought to stand the test even of being thus directed, without showing a flare. There might, indeed, be a universal indistinctness of the image caused by reflection of the sun's light over the entire field. Merely shading the lens with a hat or a piece of black cloth would do away with this, and leave the image clear and brilliant, no matter whether a small or a large stop were used.

The exhaustive tests made in earlier days for speed or quickness of any lens, have now no great significance, in landscape photography.

In instantaneous photography flatness of field and reach must all be present in much greater degree than is necessary for even the more difficult kinds of landscape, inasmuch as the lens will always be used with a large stop. Any lens that can be made to give reach, and good marginal definition only by the introduction of small stops, is comparatively useless for instantaneous photography.

Architectural photography will require an additional test to be made. The qualities just alluded to must all be present, but the image must be examined for distortion. It is doubtless well-known that all lenses of the plano-convex or meniscus form distort straight lines at the edges of the field into curves. Perhaps the easiest way to realize this is to pin a large sheet of

white paper on a board, and draw four distinct lines forming a square on it with ink. If this figure be now copied by the camera with a single lens, the square will be seen to have curved or barrel-shaped corners. In this experiment, the board holding the paper must be strictly parallel with the ground-glass of the camera.

The commercial doublet lenses are generally free from distortion of this character, but compared with single lenses are no better for *purely landscape subjects* on that account. A single lens has long been known as the best and decidedly the cheapest form of lens for this class of work. We should, however, not advise any photographer to limit himself to single lenses. Cases will constantly occur where the distortion of the single lens would make itself very disagreeably prominent. A good rectilinear or symmetrical will be the more generally useful, if the outfit must not include more than one lens.

If an instrument be desired for the accurate copying of plans, maps, drawings, etc., the tests for the lens for architectural purposes will be sufficient.

Lenses for *portraiture only* are most useful when they give a very sharp image with great reach or depth of focus on the central part of the plate, marginal definition not being so important. When tests are made, the sitter should be posed quite near to the camera so as to make the head very large, and repeated trials made to see, with how large a stop thoroughly good definition of the whole head can be obtained. This will be found in practice to test the reach of lens very severely. The reason why many photographers have lately turned out fine specimens of large heads, is that they have used lenses originally intended for architecture and copying, such as the various forms of rectilinears, etc., and relied upon plates of extra sensitiveness to make up for loss of actinic light. Attempts of the kind made with large aperture portrait or group lenses would have ended in failure.

We have purposely avoided giving figures or exact indications of what lenses may be expected to perform, as of course there is too much difference in the various styles and sizes to render it possible to say just what may be expected.

THE GENESIS OF HELIOCHROMY.

BY JULIUS F. SACHSE.

AT a late meeting of the Photographic Society of Philadelphia mention was made of a daguerreotype plate which had been sent to the Franklin Institute, of Philadelphia, about 1862 or 1863, as a very great curiosity, and which M. Becquerel claimed to have made in the camera. It represented a Scotch plaid or shawl. The picture, which originally had very bright colors, was considerably faded when exhibited before the Institute. In the discussion which followed it was claimed that this had been nothing different from the old chloride of silver process.

As a matter of fact, thirty to thirty-five years ago daguerreotypes more or less colored were no great novelty. In the photographic department of the Centennial Exhibition, in Philadelphia, in 1876, if we mistake not, there were three exhibits which contained daguerreotypes with some color, viz., M. A. Root, of Philadelphia, who made a progressive exhibit of the various improvements in the art from August, 1839, to May, 1876; J. H. Fitzgibbon, of St. Louis, who showed a collection of old daguerreotypes; and one other, whose name has been forgotten. Some of these specimens showed green, red, yellow, and blue. On investigation at the time we found that the effects were produced in two ways. In the first and oldest method, of which the specimen above alluded to was a sample, the sensitive surface had been treated so as to bring out more or less decided shades of color,—if our memory serves us right, the specimens all shading to a dirty brown on the edges of the color, somewhat similar to the oxidation on tempered steel.

As far back as 1848 Niepce obtained color on daguerreotypes and makes mention of them in his memoirs to the French Academy. His first process consisted in first coating the plate with chemically pure silver by the use of a battery; the plate was then well washed in water and dried by a spirit lamp. These plates could not be rendered very sensitive, as from two to three

hours were required to produce a decided effect in the camera; after all they could not be permanently fixed. This process was shortly afterwards modified by Edmond Becquerel, the French physicist, who produced the most successful heliochromes in color, without, however, leading to any practical results. His method was as follows:

Taking a silver plate, such as is used in daguerreotypes, he obtained a thin and very uniform coating of silver chloride on its surface. This he sometimes effected by soaking it in chlorine water until the silver assumed a rose tint, or by dipping it into solutions of cupric or ferric chloride. By preference, however, he placed the silver plate in a solution of hydrochloric acid, and attached to it a wire from the positive pole of a voltaic battery, the wire from the negative pole being fastened to a plate of platinum, which also dipped into the acid solution. By this means the hydrochloric acid was decomposed, and the chlorine being drawn by electrical attraction to the silver plate, combined with it chem ically, forming a surface of silver chloride of great purity. As the combination of silver and chlorine took place the layer of silver chloride gradually increased in thickness, and as it did so its color changed to gray, yellow, violet, blue, and continuing the action these colors appeared a second time. When the second violet tint had been obtained the silver plate was withdrawn from the solution, washed and dried, and gently heated until the surface assumed a rosy hue. When the spectrum of sunlight or of the electric arc was received upon a plate so prepared, an exposure of a few minutes was sufficient to impress the diverse colors. Images of highly colored dressed dolls were also obtained.

It, however, remained for a countryman of our own, Charles G. Page, M.D., Professor of Chemistry in Columbia College, Washington, D. C., to obtain colors on the daguerreotype which were permanent. His suggestions were as follows:

As copper assumes various colors, according to the depth of oxidation upon its surface, it follows that if a thicker coating than the first mentioned (a very slight deposit of copper from the cu-

preus cyanine of potassa,—just enough to change the color of the plate in the slightest degree) can be put upon the plate, without impairing the impression, various colors may be obtained during the fixation. It is impossible to give any definite rules concerning this last process; but the best results were obtained by giving the plate such a coating of copper as to change the tone of the picture,—that is, giving it a coppery color, and then heating it over a spirit lamp until it assumes the color desired. A picture shown was of a beautiful green color, and the impression had not suffered in the least by the oxidation. The color here is due to the surface of the picture itself. For pure landscapes the effect was pleasing, and by adopting some of the well-known methods of stopping-out the deposit of copper, the green color may be had wherever desired. In some pictures a curious variety of color was obtained, owing to the thickness of the deposit of copper, which was governed by the thickness of the deposit of mercury forming the picture. In one instance a clear and beautiful ruby color was obtained, limited in a well-defined manner to the drapery, while all the other parts were green.

The second and general method, which has no more to do with heliochromy than has chromo-lithography, was by the use of dry colors which had been stippled on the daguerreotype,—a process which came into almost general use among the daguerrean artists in country districts, in whose practice it is needless to say that the colors were not spared. The jewelry was also always touched up with a gold bronze, and became a prominent feature of the picture.

The method employed was to take the finely ground colors (carmine, white, lilac, sky blue, pink, yellow, orange, brown, purple, light green, dark green, and blue), dissolve a little in a glass of water, then filter through blotting-paper; the residue was then dried for use. The coloring commenced with the flesh tints on the face, which was stippled on (not rubbed) with a fine camel's-hair pencil, beginning with the centre of the cheek, taking care not to go over the outline of the face, and also not to have too much color in the brush. The eyes and eyebrows were not touched with color after the flesh tint was applied. A piece of soft cotton was passed backwards and forwards over the face so as to

soften down the color, then the carmine was applied to give the required tint. Very light hair was improved with a slight shade of brown. With the above-mentioned assortment of colors it was an easy matter for the *artist* to reproduce the drapery; a little white on the dickey or lace, and a liberal quantity of shell gold on the jewelry, or where it was supposed to be, completed the artistic abortion.

The subsequent perfecting of the gallotype or photographic process, and its gradual introduction into general use, soon relegated the daguerreotype, with its brass mat and morocco case, among the things of the past. At the same time the experiments in heliochromy ceased for the time being, until now, after the lapse of two decades the question has again arisen among a number of active researchers and students, in both hemispheres, who, though often working with methods diametrically opposite, are striving for the much-coveted solution of the problem.

PHOTOGRAPHY IN THE TROPICS.

I MET in the Bahamas an accomplished English gentleman, who said, "I can do no developing on ship-board. I have used the best plates, and had all needful appliances; but frilling destroyed all my negatives."

He admitted that he had not tried the tropical plates. The question was raised in my mind; Am I to have this experience? If so, I shall miss the great object of my trip! I remembered that my little dark room on the good yacht "White Cap" was hotter than any place on earth need be, and thought of the scenes I had come so far to obtain sliding off in fragments from the glass.

It is my rule to do all my developing at once, so that I am spared the mortification of discovering that I have made a bad exposure after I am a hundred or a thousand miles away.

I used Seed's No. 23 plates, and a Prosch triplex shutter, on a Dallmeyer rapid rectilinear lens.

So much for the elements of the problem. Frilling, I found, was best obviated by using a strong alkaline pyro developer, with an excess of pyro. Thus I gained the intensity that I usually obtained by slower developing. The plate was never removed from the developer until it was almost wholly dark.

Seed sensitometer 23 I found rapid enough for all my work, and I have no doubt that plates of corresponding grades made by any reputable firm would have done as well.

Cloud effects I greatly desired, and hence all my exposures were with the Prosch shutter at its ordinary slowest rate. When this promised over-exposure on a sandy shore, or at noon, I was enabled to use a smaller stop, thus gaining in sharpness of the negative.

So far as I can see, few if any of the negatives (160 in number) were under-exposed. Washing the hypo and alum out is a serious problem on ship-board where water is scarce. It should be known to amateurs that prolonged soaking is no bad substitute for thorough washing,—if one can do no better.

My rack held one dozen 4x5 plates. These, rack and all, were placed in a bucket of water, allowed to soak for two hours, and then removed and placed in a bucket of fresh water for another hour, rubbed lightly with wet absorbent cotten, and placed away to dry. Of course after prolonged use a wooden pail may become saturated with hypo and so be unfit for use. Its cost is so small that it can be thrown away and a new one used.

Thus by *quick development*, and *simple soaking*, I have secured, under circumstances far from favorable, a goodly number of negatives of at least average quality.

This article is simply one paragraph in an experience meeting in which I hope the friends will be led to tell of some better method.—J. T. ROTHROCK, yacht "White Cap."

Aunt Belinda wants to know "how can the stupid man expect to get a *speaking likeness* when he always tells me to *close my lips* and think of the days of my *childhood?*"

LANDSCAPE ART.

BY XANTHUS SMITH.

THE curious photographic and fine art turn which Joseph Jefferson gives to the closing chapter of his admirable biographical recollections, and the large amount of space devoted by one of our able contemporaries to quotations from it, and also the ample use of illustrations, at second hand, which the latter has made in connection with them, by permission of the Century Company—must be our excuse for offering some remarks upon Mr. Jefferson's views about landscape art.

It is sufficiently annoying to persons well acquainted with the subject, to see wealthy but ignorant purchasers in this country daily expending large sums upon dubious works by certain French landscape painters, but when those whose cultivation should have taught them better, publish broadcast, and others republish, the common cant of the totally unlearned in art, one cannot help feeling that in justice a few remarks should be made on the other side.

We quote a paragraph from the reprint referred to :—

"The French school of landscape painting attracted me very much, and after carefully studying its philosophy, I am of the opinion that the greatest landscapes are works of the imagination rather than transcripts of realities. Nature refuses to be imitated, but invariably rewards the artist who has the modesty to suggest her. The painter who attempts to give an exact picture of a natural scene will find himself surrounded by insurmountable difficulties. As an example, let us suppose that he takes for his subject a certain view with which we are familiar; the sky, water, foreground, trees, and distance may be painted in the exact form, colour and perspective proportions of the original, and yet fail to give one an idea of the spot. What is the reason of this non-resemblance when all the details have been carefully imitated? What is it that has no existence in the picture, and that so pervades nature? Where are the sweet sounds of the woods? Where is the singing of the birds, the hum of busy insects, and the murmur of the brooks? Where is the movement

of the clouds, the graceful bending of the tree and the perfume of the pines and the woodland flowers? He cannot paint these, and so his realistic work is cold and lifeless. But if in modest truth he suggests his work, omitting hard details and impertinent finish, the simple picture will lead us in our imagination to supply the artistic improbabilities of sound and movement. When I first saw the works of Constable and Corot, I did not like them. They seemed to be devoid of subject, and there was an unfinished look about them that gave me the idea of mere sketches carelessly painted. I gradually began to understand what they meant. I then discovered that it was I that was at fault, not the artists, and I felt ashamed that I had seen so much and knew so little."[1]

It is an admirable specimen of a great deal of writing that is now being published about art by those who have dabbled just a little in the subject,—it sounds very learned and poetic, and gives the impression that those who entertain such views are lifted away above persons of ordinary understanding, and no doubt they have allowed themselves to drift into a very enjoyable state of mental delusion on the subject of nature and art. To be able to hear birds sing in trees whose sprays can be seen moving under clouds that actually float upon canvas, is indeed charming. But, we ask, cannot some of us less gifted mortals, in our inferior imaginations, see quite as much in admirably painted pictures of really exquisite scenes in nature?

To those who have paid sufficient attention to the subject to look at any of the works of the present excessively extolled French landscape painters, it will not be necessary to explain the universally commonplace, we may truly say, mean subjects, the total absence of composition and of good drawing, and the dirty, heavy tints that are smeared upon the canvas.

We are fond of genuine impression works too. Indeed there is nothing more obnoxious to us than an exact transcript of nature, or a painting without soul or poetry, and it is so far impossible to copy nature minutely in her finest effects, which are always

[1] If the above quoted views about landscape art were really true, where would the beautiful art of landscape photography be, with its exquisite rendering of detail finish

the most transient, that true art must always be impressional, but art is one thing and imagination another, and when a painting has so far drifted from the realms of art that it has become totally impressional—why—any one may rest themselves down in the middle of a dirt road bordered by two post-and-rail fences, and, imagining it one of the most magnificent scenes in nature, make a hurried smear of it on canvas, and any one else may come along and imagine it the greatest work which has ever been produced. But that does not make it so. Thoughtful people of taste will say at once. Are there not thousands of grand and beautiful scenes in nature and as we have been given the sense to observe and appreciate them, why should they be ignored in painting?

Is not a well drawn and skillfully executed representation, by a painter of genius, of a beautiful scene in nature just as poetic as a mere daub? Yes, and so it is. But, my dear reader, such a work cannot be executed by anybody, who imagines that they have a gift to be an artist, or that they are a born connoisseur, nor can such genuine work be multiplied and foisted off on the public, making a lucrative trade for dealers and others. Alas! poor landscape, execrable drawing, and daubing and smearing are not tolerated in figure painting. Hence we find such men as Gérome, Meissonier, and Bouguereau, and a host of others that I could name, winning their laurels and their fortunes during their life-time. It has not been necessary for them to have passed away before it could be discovered that they were great. Who that has had a little time to dabble in art could produce such work? And there is just as fair an opportunity for the display of correct drawing and fine harmonious coloring in landscape art as in figure painting.

We hope sincerely that the day is not far distant, when there will be a more just appreciation of what constitutes the really grand or beautiful or picturesque in nature, and of the works of those who have been gifted with the powers to truly see and portray it.

In the meantime we hope that those who are innocently and thoughtlessly aping the ignorant popular cry about French landscape painting, will pause and consider whether they cannot look more deeply into the subject.

DRY PLATES AT TEN CENTS PER DOZEN—EVERY AMATEUR HIS OWN PLATE MAKER.

BY E. CHABLE.

WE translate the following interesting paper on the home preparation of gelatino-bromine dry plates from *Les Annales Photographique*, which in turn credits the article to the *Revue Suisse*. M. Chable states:

Are there many amateurs who prepare their own sensitive dry plates? I deny it. I know that when I made the announcement that I was making my own plates my colleagues laughed at me. I used a formula recommended by Dr. Eder, and I can say that the results were satisfactory.

Every amateur or photographer having spare time can try the experiment at a cost of not more than thirty or forty cents, produce his own plates, and I am fully persuaded that if he follows strictly the instructions he will obtain good results.

The manner of operation is a slight modification of the formula indicated, viz.—

Take three glass vials, with wide mouths, and two stone bottles, one holding one pint, the other about eight ounces. The stone bottles (which can be bought of stationers or ink makers) are to contain the emulsion after it is ready, and as they are perfectly opaque they can be exposed to the light without danger.

In Vial No. I. we place:

Bromide of potassium	8 gr.
Iodide of potassium	40 c.
Gelatine (winterthur)	1 gr.
Water; distilled	50 gr.

In Vial No. II.:

Nitrate of silver	10 gr.
Water, distilled	70 gr.

To this solution of nitrate of silver add some ammonia drop by drop, stirring with a glass rod; a brown precipitate will form;

continue adding ammonia drop by drop until the solution becomes clear. Of course the nitrate of silver is dissolved before the ammonia is added.

In Vial No. III.:

Gelatine (Winterthur)	15 gr.
Water, distilled	170 cm.

All these operations can be made by gaslight or an ordinary coal oil lamp.

Then take an ordinary pot in which the three vials can stand upright, and pour in warm water, about 35°–40° Centigrade (90°–100° Fahrenheit), not hotter.

The salts in No. I. will dissolve in about ten minutes; we then go into the dark room to make the emulsion by ruby light. A large water bath, about 37° Centigrade, will have to be prepared beforehand. In this bath place the eight ounce stone bottle upright. We then mix the contents of Vials Nos. I. and II., pouring them one after the other in the stone bottle. This must be well shaken, well corked, and placed for forty minutes in the bath, the water being kept at 37° Centigrade. We then place Vial No. III. alongside the stone bottle in the water bath; they both require the same temperature.

At the end of forty minutes the temperature of the bath is lowered to 30° without danger to the gelatine, which now ceases to remain fluid.

Remember that Vials I., II, III. are of glass.

Now pour the solution of gelatine in the pint bottle which was previously warmed, then add the contents of the small stone bottle to the mixture in the large stone bottle; cork, and shake well for two or three minutes. All this must be done by ruby light.

The emulsion is now complete. After a lapse of ten minutes pour it into a porcelain or glass dish; let it cool and become gelatinous. Put this into a closet, protecting it against the light until the next morning.

The emulsion at this point is very sensitive to light, and the slightest actinic ray will spoil or fog it. In my own practice I

place the dish in a pasteboard box in a closet, of which I keep the key in my pocket.

All three operations are very simple, and take not over an hour's time.

In the morning the emulsion is ready for the final washing. The materials necessary are a hair-sieve and a piece of embroidery canvas. If there is no hair-sieve handy, take a little box without a bottom and draw a piece of muslin over it.

The washing process has to be done by a ruby light.

Now take the emulsion out of the dish with a silver or horn knife, and put it in the middle of your canvas, folding it and twisting it with both hands inwardly, so that the emulsion is forced through the interstices of the canvas in thin bands, falling into the hair or muslin sieve.

It is well to have fresh, cold water at hand to cool your hands otherwise the heat of the body might melt the emulsion. I may add that the emulsion will not stain the hands if well made.

After all has passed into the sieve it must be placed in a basin full of water, where it will have to remain for an hour. The water must be changed three or four times, or, better yet, place the whole under a tap, where it may wash for half an hour.

Then drain the emulsion, and put it in a vial with a wide neck which is placed in warm water, the temperature of which is of little consequence, to melt the sensitive gelatine.

After the emulsion is melted, we proceed to coat the plates,—or pour it in the stone bottle for future use. Of course the vial must be warmed in a water-bath to melt the emulsion.

The plates must be absolutely clean before you coat them; I usually use old or spoiled plates. To remove the gelatine I use a strong solution of muriatic acid in water, after the plate is well washed and polished with chamois skin.

Then place the plates on a marble slab—a mantlepiece will do—and pour on about ten per cent of the emulsion, extending it over the plate equally with the finger; this is the simplest way for the amateur.

The emulsion will set in two or three minutes, when you can set them up to dry.

It is absolutely necessary to place them in a bureau-drawer inaccessible to light; or better still, in a box made for the purpose, arranged with divisions to receive the plates, and which can be locked and is light-tight; this should have a receptacle in the bottom to hold from 200 to 300 grains of chloride of calicum.

A trunk, with the plates inclining towards the four sides, and covered, will serve the purpose of a drying box. The time, however, must not exceed twenty-four hours. I add here that these plates are very sensitive.

Plates thus prepared were never known to fog, unless the emulsion was badly prepared, or, in other words, if the emulsion is properly prepared the plates will always work clear.

All developers work well with these plates. If by chance the film should frill during development, it will prove that the glass was not thoroughly cleansed. To avoid this trouble the plates should be placed in an alum bath as soon as they are developed, before they are placed in the fixing bath.

The expense of coating three dozen plates, 4x5, will be from thirty to forty cents, according to the material bought. I advise all amateurs to try the experiment.

A process termed fluorgraphy is taken from a French journal by the *Scientific American*. It is briefly the transferring of lithographic or photographic prints to glass by means of fluorated inks, which, in contact with sulphuric acid, disengages hydrofluoric acid, which eats into the glass. The phototype is inked with the following compound:

Soap	50 grams.
Glycerine	200 "
Tallow	50 "
Water	100 "
Borax	25 "
Fluorspar	50 "
Lamp-black	15 "

Negatives are taken and transferred to the glass. The latter is surrounded with a border of wax and covered with sulphuric acid of a density of 64° or 65° B. After fifteen or twenty minutes the acid is poured off, and the glass is washed with water and cleaned with a solution of potassa, then washed with water again.

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PHOTOGRAPHY IN THE COLORS OF NATURE.

BY F. E. IVES.

(*Continued from page 72.*)

IN February, 1888,[1] I demonstrated a procedure based upon the assumption that, although there are more than three or five or seven primary spectrum colors, all of them—and in fact all the colors of nature—can be counterfeited to the eye by three type colors and mixtures thereof. This was not a new observation, and my plan did not differ very materially from that of Dr. Stolze, minus the complication of a fourth negative, except that it was more definite; and instead of merely publishing it as a suggestion, I found means to carry it out, and made a practical demonstration of it. I proved the process by photographing the spectrum itself, employing compound color screens carefully adjusted to secure definite intensity curves in the spectrum negatives, so that they would make color prints which counterfeited the color effect of the spectrum when superposed. The adjustment of plates and screens to secure *spectrum negatives having definite intensity curves*, which, I believe, had never before been done, made all the difference between an indefinite and uncertain method and one definite and precise.

Promising results were obtained by this process, but I soon came to the conclusion, already reached by Dr. Stolze, that a process might reproduce the color effect of the spectrum, and yet not be capable of reproducing perfectly the compound colors. The solution of the problem was incomplete until I discovered a new principle, according to which such a procedure can be made to reproduce not only the spectrum, but also all the hues of nature.

This new principle, first stated by me in a communication to this institute on November 21, 1888,[2] is that of making sets of negatives by the action of light rays in proportion as they excite

[1] *Journal of the Franklin Institute*, 125, p. 345.
[2] *Journal of the Franklin Institute*, Jan., 1889.

primary color sensations, and images or prints from such negatives with colors that represent primary color sensations.

In order to understand this principle, I must explain that although the spectrum is not made up of three kinds of color rays and mixtures thereof, the eye is only capable of three primary color sensations,—a distinction of the utmost importance, for the reason that the spectrum rays, which most powerfully excite a primary color sensation, are not the ones which represent the character of that sensation. The primary sensations are red, green, and blue (violet); but it is not the red, green, and violet spectrum rays that most powerfully excite these sensations. According to Clerk Maxwell, the orange spectrum rays excite the red sensation more strongly that the brightest red rays, but also

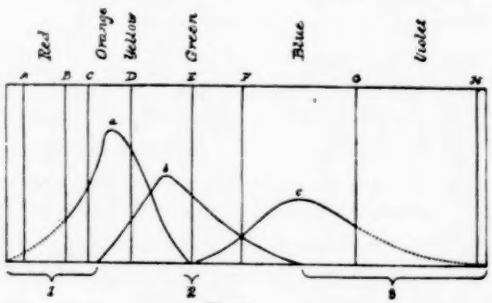

Fig 1

excite the green sensation; the greenish-yellow rays excite the green sensation more strongly than the purest green rays, but also excite the red sensation; the yellow rays excite the red sensation as intensely as the brightest red rays, and the green sensation as intensely as the purest green rays. Maxwell's diagram is a graphic representation of the result of careful photometric measurements of the effect of the spectrum upon these primary sensations.

1, *2*, *3* are spectrum colors, which represent primary color sensations, because each excites one primary color sensation exclusively, and *a*, *b*, *c* are curves, showing the relative power of spectrum rays to excite the respective primary sensations.[3] These

[3] Taken separately, each of these curves is probably correct; but the three do not compound to represent accurately the relative visual intensity of different parts of the

conclusions are stated and indorsed in all recent text-books on color, and that eminent physicist, Lord Rayleigh, goes so far as to say that the theory is as well proved as the law of gravitation.

I emphasize this because another theory of color has recently been proposed, which, although it has been circulated in the newspapers as if it has been circulated in the newspapers as if it had high scientific indorsement, is really inconsistent with established facts, and cannot, therefore, be true.

The carrying out of my new principle, according to Maxwell's measurements, therefore, involves the production of one negative by the joint action of the red, orange, yellow, and yellow-green rays, in definite proportions, to represent the red sensation; one by the joint action of the orange, yellow, green, and green-blue rays, in definite proportions, to represent the green sensation; and one by the joint action of the blue-green, blue, and violet rays, in definite proportions, to represent the blue sensation.

Negatives of the required character can be made by exposing a cyanine-stained gelatine-bromide plate through a double screen of chrysoidine-orange and aniline-yellow of suitable intensity for the red sensation, a cyanine-erythrosine gelatine-bromide plate through a screen of aniline-yellow of suitable intensity for the green sensation, and an ordinary gelatine-bromide plate through a double screen of crysophenine-yellow and RRmethyl-violet for the blue sensation. The plates and screens are correct when they will secure negatives of the spectrum showing intensity curves substantially like the curves in Maxwell's diagram. The negatives can also be made on certain makes of ordinary commercial gelatine-bromide plates of the most rapid kind, by the use of quite different color screens for the first two, but only with exposures of from five to fifteen minutes on well-lighted landscapes, aperture of objective *f.* 12.[4]

spectrum, because the curve of the green sensation is relatively too low, and that of the blue sensation too high; if the curve of the green sensation be drawn as high as that of the red, and the height of the blue curve be reduced one-half, they will compound to represent fairly a photometric measurement of the visual intensity of the spectrum.

[4] I claimed that the production of such a set of negatives as I have described represented the application of a new principle in composite heliochromy. Some photographic *littérateurs* were disposed to sneer at such a claim; but after leaving the matter open for discussion for nearly two years, I applied for a United States patent, and, in view of all the evidence, was granted exclusive right to make such sets of negatives.

In photographing objects in a changing light—landscapes, for instance—it is important that the three sensitive plates be exposed simultaneously ; and in order to accomplish this, I devised a triple camera, having three lenses so arranged in connection with reflectors as to bring all the points of view within a one-inch circle. With this camera, the production of sets of negatives of the required character is a simple and easy matter, it being only necessary to insert the plates, raise the flap until the exposure is made, take the plates out again, and, when convenient, to develop them together, in the ordinary way.

There are two ways of making the heliochromic pictures from light and shade which characterize good monochrome photographs. All that showed bright colors resembled nothing so much as cheap chromos. In the composite heliochromes by my process, which I show to-night, the colors are, as you can see, as perfect in detail and gradation as the monochrome shades of an ordinary photograph.

According to Captain Abney, the pictures produced by the silver sub-chloride process are "photographs in natural colors." Those which I now show are not so in the same sense, but they are something more and better than that,—they are photographs in the colors of nature.

I have already spoken of a class of writers who still believe in the ultimate success of the silver-chloride process, or something like it. It is not very surprising that men imbued with such a belief should be displeased with the idea of composite heliochromy, which is something short of a miracle; but the worst of it is that they will not even take the trouble to make themselves familiar with the subject, and almost every utterance they make in reference to it is calculated to mislead the public and discredit true progress. I do not know how many times such writers have assured the public that composite heliochromy was based upon the same principle as chromo-lithography, and was merely the production of colored pictures by the aid of photography. Even Dr. Eder, a most able photographic chemist, is reported to have assured the representative of a London newspaper that my process was "chromo-lithography, in which photography is only an accessory"! (*To be continued.*)

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A STATED meeting was held on Wednesday evening, February 11th, the president, Mr. J. G. Bullock, in the chair.

The Board of Directors reported the election of the following active members: Charles Howell Miller, Robert M. Elliott, and Nathaniel Howland Brown.

Dr. Charles L. Mitchell read a paper on "Intensification," of which he subsequently gave a practical demonstration.

An exceptionally fine collection of lantern slides, illustrative of Japanese life and customs, and loaned by Dr. E. H. Williams, were shown. The slides were colored by Japanese artists, and their exhibition was rendered doubly interesting by the presence, as invited guests, of four Japanese gentlemen, Messrs. Tsuda, Terashima, Tsuji and Suzuki, who gave a quaint and often witty explanation of the views on the screen. At the conclusion a vote of thanks to the Japanese visitors was proposed by Dr. Mitchell, and carried unanimously.

Mr. Carbutt presented for examination some positive prints on thin sheets of celluloid, to which he had given the name of "Cellugraphs." The prints were made by an exposure in diffused daylight of one to one-and-a-half seconds. It was recommended to tone them in the following bath: 16 ounces of water, 3 grains chloride of gold.

Mr. Bell exhibited a few pictures on the same material as that shown by Mr. Carbutt. His first trial had failed from his own lack of knowledge how to develop them. By weakening the developer down very much and timing fully, the operator could have the development under perfect control,—could stop anywhere, and could use quite a quantity of light in developing. He had not tried them by gaslight; they were all exposed by daylight.

Mr. Bell showed a negative made on a Cramer 50 plate, with very brief exposure. It was about twice as dense as should be, but was shown to illustrate the value of a developing formula which he had devised. By weakening the developer a negative of proper density could readily be obtained, and the difficulty sometimes experienced in getting full density with very rapid plates was entirely overcome.

Mr. Carbutt thought that the method of instruction defined by Mr. Bell—viz., development until the image is seen on the back of the glass—was an erroneous one. If adopted by beginners or others developing their own negatives, they would get just such an over-dense result as shown by Mr. Bell. Density should be determined by exam.

ining by transmitted light, not by depending on what is shown on the back of the plate. All plates will not bear development so far; they would get very hard.

Referring to the plate exhibited, Mr. Bell said that the Cramer 50 is one of the hardest plates to handle in the market. If he should take a Carbutt B. and treat it as he had done the Cramer 50, it would be "cast iron," unless he had increased the time of exposures five times. He was quite sure that his mode of instruction to see the image on the back, and not through it, would give the better negatives.

Dr. Mitchell believed that the best results were obtained by a combination of both,—that is, looking at the back and at the face of the negative. The action of the developer on the silver in the plate is gradual, penetrating from the exterior all the way through to the back. Now if, when we develop a plate, the image comes up bright and clear, keeps on clearing, and then commences to fade away and darken out, and we look at the back of the plate and notice that it is perfectly white, we can reasonably suppose that the density of that plate is more apparent than real, from the fact that we are not only looking through a deposit of silver, but also a certain amount of unacted-upon silver, and we have to allow for that in making a calculation of density. On the other hand, a thin plate may be developed until the back is nearly as black as the front, and yet have no density; so that the proper method to pursue, he thought, would be a combination of the two: looking through and looking at the back of the plate, at the same time bearing in mind the quality of the plate,—*i. e.*, whether a slow or a fast plate. A slow plate has always more density than a fast one.

Mr. Cheyney, referring to Mr. Bell's remarks, said that in all his experience in using fast plates he spoiled them if he carried on the development until he could see the image on the back. It could not be carried out until the image was visible on the back without being all fogged up. On the other hand, for a transparency plate, in ninety-nine cases out of a hundred, it would be just right, given the right amount of exposure.

Mr. Pitman declared in favor of development first in eikonogen and afterwards in hydrochinone. There would then be no trouble in getting any density desired.

Mr. Carbutt said that when in Liverpool he saw some very fine negatives, made by an amateur, which were developed in this way.

Mr. Pitman said that a good many developed in a mixture of the two. He, however, recommended getting all the detail desired with the eikonogen, and then, in the hydrochinone, obtaining the required density.

Mr. Redfield showed a sample of "Dr. Andresen's Eikonogen Cartridges." They provided a portable form of eikonogen developer, for use in traveling, or when such form might be desirable. For use they were simply broken, and the contents dissolved in a proper quantity of water.

The chairman called the attention of the members to the fact, noted in the medical journals, that uranium salts were of an extremely poisonous character. Heretofore it had not been known how poisonous they were, and it would be well to bear this in mind in using them.

Mr. Stirling:—I would like to ask a question of the society. I have here a Darlot lens, made specially for lantern projection, which has some peculiar features. It has a 10-inch focus. The ordinary lenses which are furnished for the same work are the Darlot 4–4 lenses, which are probably, I was going to say, twice the diameter.

The question I want to ask is, Whether this lens ought not to transmit as much light as the larger lenses? If it does not, what proportion of the light does it cut off? Theoretically the objective is placed in the focus of the condenser. To be perfect that ought to be a point,—the point of a cone. Now why a lens of that diameter should not transmit the whole of the light is an interesting question.

In the present number of the *British Journal* the editor, under the head of "Lanterniana," takes up that point, and says that the answer can be both yes and no; that if the radiant is as it ought to be, in theory an absolute point,—if the condensers transmit the rays as they ought,—*i. e.*, converge them to a point, then a lens of small diameter should transmit as much light as the larger one, the additional glass and brass work being so much waste and expense. In the matter of expense I would say that a 4–4 Darlot lens is worth $32.00 or $34.00. I do not know what this may be worth; but it cost less than a third of that figure.

The editor of the *British Journal* goes on to say that practically the radiant is not a point; it sometimes spreads until it is perhaps three-quarters of an inch in diameter. The slide also tends to diverge the rays, so that instead of being a cone at the focus of the condenser, there is a bundle of rays of varying thicknesses, dependent upon the degree to which the condenser and the slide destroy the perfect convergence of the rays; so that under certain circumstances this lens will transmit as much light as the other, but the chances are that the convergence won't be perfect, and therefore the larger lens is better.

A writer in a book just published on "Optical Projection" says that opticians have gone to the extreme in either direction. For long-

focus work they have provided lenses of three and four inch diameters. He says it is utter waste of material. In some foreign lanterns the low-power objectives are made with the rear combination larger, because the lens, being brought closer to the condenser, the angle is a greater one, and there is more danger of rays being cut off there than with a longer focus lens, where the angle is a narrow one.

I would like to ask whether any of the members have thought about this, and whether any light can be given on that point?

Mr. Cheyney:—Some years ago Mr. D. S. Holman, then Actuary of the Franklin Institute, found that in order to get the best illumination for the lantern microscope, and also for the table microscope, the angle made by the rays from the condenser should coincide with the angle with which the objective should receive them, in order that the rays should not be refracted any more than possible; or, in other words, there should be a certain relation between the focus of the condenser and that of the objective, and that wherever this relation was changed it was done at the expense of light.

Adjourned. ROBERT S. REDFIELD, *Secretary.*

INTENSIFICATION.[1]

In presenting to the society this evening these few notes on intensification, it is not my intention to offer anything new, but merely to call attention to some of the most important details of an old and well-known process,—namely, that with mercury and sodium sulphite.

The following method, which was originally formulated by Mr. John Bartlett (the former editor of this journal), can be depended upon to give certain and satisfactory results in every case.

The details are as follows:

The negative (film or glass) should, after fixation, be thoroughly washed and then dried. The dry negative is then placed in a suitable dish, film side up, covered with clean water, the face swabbed over thoroughly with a tuft of absorbent cotton to remove air bubbles, allowed to soak for a few minutes, and then the water poured off, and sufficient of the following solution poured on to cover the plate. The solution is composed of

Citric acid	60 grains.
Perchloride iron (dry)	60 grains.
Water	1 pint.

[1] A paper read before the Photographic Society of Philadelphia, February 11th, 1891, by Charles L. Mitchell, M.D.

This is kept in constant agitation over the plate for about a minute, and then returned to its bottle, and the plate washed under a running stream of water for about five minutes. This solution can be used repeatedly for a long time before becoming exhausted. Its use is two-fold: it tends to remove any thin film of fog upon the surface of the negative, and also furnishes a groundwork for the subsequent deposit of mercury. The plate is now bleached by being placed in the following solution:

Mercury bichloride	½ ounce.
Common salt	½ ounce.
Water	1 pint.

The plate must be frequently rocked while in this solution, and allowed to remain in it until sufficiently bleached. This is regulated by the amount of intensification required. If considerable density is desired, it must be allowed to remain until quite white. This solution is then to be poured off, and can be either thrown away or used for several more plates; the best results are obtained, however, by using fresh solution for each negative. The plate is next covered with a sufficient quantity of the following solution:

Common salt	2 ozs.
Water	2 pints.

This is allowed to remain on the plate for about a minute, then poured off and thrown away, and the plate well washed under the tap for about five minutes. The object of the salt is simply to dissolve out any mercuric chloride remaining in the film, and prevents the clear portions of the negative from becoming clogged up with any reduced mercury in the next operation. The plate is now returned to the dish, and a sufficient quantity of the reducing solution poured on it to just cover it. This is made as follows:

Sodium sulphite, cryst.	3 ozs.
Acid sulphuric, conc.	2*f* drs. or ½ oz. by weight.
Water	1 pint.

The sulphite is dissolved in 12 ozs. water, allowed to cool, and then the acid previously mixed with 4 ozs. water added. I should say just here to those not familiar with chemical manipulation that in mixing sulphuric acid and water the acid should always be poured gently and in small quantities into the water, not the water added to the acid, as in the latter case, owing to the violence and heat of the combination, some of the acid might be thrown in the face of the operator.

As soon as the reducing solution is poured on the plate it commences to turn brown and then black. The operation is completed

when the *back* of the plate is perfectly dark, showing no traces anywhere of the whiteness caused by the mercury. The negative should then be perfectly bright and clear, and of a brilliant bluish-black color. It is then to be placed under the tap, washed for five or ten minutes to free it from all traces of sulphite, swabbed off with a piece of cotton, and set up in a rack to drain and dry. The reducing solution can be used several times until it becomes exhausted, and is then thrown away. It should never be returned to the original stock bottle. This process can be depended upon to yield in every case good and satisfactory results, and the intensification produced is perfectly permanent in character. The main points to which attention must be directed in order to secure good results are these:

1. All solutions used must be filtered, clear and free from specks.

2. The negative must have been previously *well washed*, so as to *thoroughly remove all traces of hypo.*

3. The negative must be moistened before the solutions are poured on, so that they will act evenly and uniformly on the plate.

A negative can, if necessary, be intensified immediately after development, fixation and washing, without being allowed to dry, but in this case the density obtained will not be so great as if the plate had been previously dried.

An Ingenious Use of Old Hyposulphite Baths.—According to a patent taken out in England, a long time ago, a solution of chloride of silver in hyposulphite of soda makes an excellent silvering bath. Thinking that bromide of silver might give good results, I tried it. The results are excellent; I was able to silver a waiter one decimetre square, and a copper cylinder, to be used as a regulator of an electro medical coil, representing at least this surface. It suffices to thoroughly wash in soapy water the copper object, and then steep in an old hyposulphite bath which has not been used for fixing positives, which would give a yellow tint. The object to be silvered is vigorously rubbed, then replunged in the bath until the surface is white. If a thick coating is wanted, a wire is affixed to the object, and to the other end of the wire is attached a fragment of zinc,—say one centimetre square for an object measuring one decimetre square,—and the zinc and the object are plunged in the bath. The quantity of silver may be increased by using cuttings of positive papers, but which have not been printed. I propose experimenting with hyposulphite baths in order to obtain a deposit of gold.—*Elie Dagreve, in Les Annales Photographiques.*

HINTS FROM A PRACTICAL PHOTOGRAPHER.

FOLLOWING is a toning bath which I have been using with fine results:

A.

Chloride gold (pure)	15 grs.
Water	15 drs.

B.

Water	32 ozs.
Citric acid	1½ ozs.
Bicarbonate soda	2½ ozs.

NORMAL BATH.

A	1 dr.
B	1 ozs.
Water	8 ozs.
Chloride calcium	1 gr.
Nitrate uranium	1 gr.

As toning bath weakens add of A, B, calcium, and uranium, to strengthen in proportions given for normal bath, allowing one sheet of paper for normal bath as stated.

TONING BATH.—NO. 2.

A.

Chloride gold (home-made or pure)	15 grs.
Water	15 drs.

B.

Water	16 ozs.
Chloride lime (common at 5c. ¼lb)	160 grs.

NORMAL.

A	1 dr.
B	½ oz.
Water	8 ozs.

This normal bath should be neutral, or slightly alkaline. If not so, make so by adding ordinary washing soda until it turns red Litmus blue rather quickly. Lovers of black tones or purple brown, or pure purple, will please try any of these baths. No. 2 seems to tone quickest, five to ten minutes, ordinary temperature say 60 degrees Far. Good tones can only be got with good negatives, and proper prints. My printing bath is made after a formula I met years ago. Here it is:

Water	1 oz.
Nitrate silver	50 to 60 grs.

To a bath of say thirty-two ounces, add about twenty-four mins of C. P. hydrochloric acid. Stir up thoroughly. Now add enough stronger ammonia to turn red Litmus faintly blue. Filter and use the same filter for each silvering. Keep up the strength of bath, and in the course of time when the bath has been hard worked, put a lump of alum in the filter, size of a shellbark. Fume twenty minutes or longer according to taste.

These baths are first-class. The silver bath does not discolor, and toning bath can be used for months, strengthening as directed according to amount of work you do.—JOHN K. MILLER, *Maytown, Pa.*

Jury of the Vienna International Exhibition, 1891.—Henry von Angeli, professor at the Imperial and Royal Academy of Arts, Vienna; John Benk, sculptor; Julius Berger, professor at the Imperial and Royal Academy of Arts, Vienna; K. Karger, professor at the Imperial and Royal School of Art-Industry, Vienna; Fritz Luckhardt, professor, imperial councilor, photographer to H. I. Majesty the Emperor; Augustus Schaeffer, director of the Imperial Picture Gallery, Vienna.

New Toning Bath for Gelatino-Chloride Paper.—

Well water	450 c.c.
Benzoate of soda (produced from the acid)	20 grams.
Caustic potash	0.1 gram.

To this solution is added 50 c.c. of

Solution of brown gold chloride	1 gram.
Water	150 c.c.

The solution should be stirred, and allowed to stand for two hours. After this time the bath will have become rose-colored, when it may be used for toning. It is said to give tones similar to those obtained with the platinum toning bath.—*G. Bani, in Photographisches Archiv.*

To Increase Sensitiveness.—A sensitiveness five times greater may be given to gelatino-bromide plates by steeping them in a mixture of 100 c.c. of alcohol at 80 per cent., from 1 to 2 c.c. of a solution of nitrate of silver in water (1 : 15), and 10 c.c. of ammonia. They are allowed to remain in this bath from three to five minutes, dried, and used immediately.—*Der Amateur Photograph.*

THE RISE AND FALL OF THE TURKEYTOWN CAMERA AND TRIPOD CLUB.

BY J. FOCUS SNAPPSCHOTTE.

(*Continued from page 85.*)

NO less a wonder was the accompanying illustrated catalogue and W. E. Ketchem guide, "How to Make Photographs." Then the letter from the agent stating that, as the Parson saw how easy the thing was done, there should be no further hesitation on his part. The result of his chance shot would be the best proof of the simplicity of the process, the excellence of their apparatus, and the certainty of the Parson's ultimate success.

The letter removed the last scruples of the Parson. The only obstacle in the way was where to obtain the needful cash.

Among the residents of Turkeytown who had hurried to the humble manse to see the photograph there was a young man,—the "dude" of Turkeytown, as the envious swains of the hamlet called him. Hippolite Leonidas Megee, with skin of a trifle lighter hue, and fortunate in having a fair common-school education, never failed to impress his importance on his more humble associates. "Hip," as he was usually called for short, was one of those smart young men to be found in all communities. A few months prior to the opening of our tale Hip had been hired to "drive" for a neighboring physician, and when out with the doctor was obliged to wear a white shirt and piccadilly collar. In addition to this Hip, on such occasions and on Sundays, wore a flaming red necktie, and a brilliant "diamond" pin in his shirt-front,—as he was wont to say, "dat's warranted twenty-five carrots pure." It was about the size of an ordinary hazelnut, and had been brought from town expressly for him by the cross-roads storekeeper at Gobblerville, out of the first month's salary he earned at the doctor's. Hip, from the time he had been in his situation, professed to be possessed of all knowledge, and looked down more than ever on his late chums in Turkeytown, even refusing to notice them unless addressed as "Mr. Megee."

Hip, who was naturally inquisitive, plied the Parson with questions, and finally asked him, "Why he didn't go into it?" The candid reply of Mr. Lamb was that it would be all right if he had the money. Hip, thinking that he saw a chance or snap, proposed to form a stock company, the same as his employer had lately formed a National Bank. After considerable explanation the plan seemed feasible, and the path of wealth once more seemed to open up before the reverend Shepherd. There was a short consultation between the two, and word was sent out to the leading brethren of the congregation to assemble at the parsonage in the evening. The meeting took place, as it always did, in the kitchen, the furniture of which, besides the wood cook-stove and corner closet, consisted of several chairs, a long wooden settee, with the inevitable chicken-feather cushion, and one of those nameless pieces of furniture which do duty as a dining-table, bake-trough, and, when the back is turned up (as it was on this occasion), as a couch or bench. There was present, besides the Parson, who presided, and Hip, who acted as secretary pro tem., George Washington White, Esq., who, notwithstanding his name, was the blackest man in Turkeytown. He was the most important man in the village. Nothing in the hamlet could succeed without his sanction. He was the trustee and treasurer of the church, the social leader of the settlement, and the capitalist of the community, and the one who bartered the ballots of the voters to such party leaders as "seen" him before election. The history of this social magnate of Turkeytown was as follows: Originally coming from no one knows where, he was taken from an institution and raised by a charitable Quaker family in our county; but, soon after getting free, drifted away from the good influences which surrounded him. When he appeared in Turkeytown years ago, and settled down, it was not long before he became conspicuous for his cunning and trickery. He always used plain talk with his white neighbors, the better to deceive them. However, he got married, worked and saved up his money, and, finding it to his interest, joined the Turkeytown Tabernacle, was elected to the chief office, and soon he virtually ruled both congregation and pastor. So it was in the village life. No matter how

honest or upright a person was, if he was of no use to Brother White, incurred his dislike, or did not give the homage to himself and wife which they demanded, that party immediately came under the taboo of Brother or Mrs. White, as the case might be, and from that moment their life in Turkeytown would be one of ostracism and misery. So it was that no enterprise could succeed in Turkeytown unless Brother White was consulted and invited at the head.

Envious people even said that if a Turkeytowner killed a hog, and did not send a pan of scrapple to Mrs. White, with an humble request to accept, the pork wouldn't keep.

Still, notwithstanding these reports, Brother White was the big man of the village, and kept adding to his importance and wealth by loaning money to his neighbors, provided the security was good and a note for $10.00 was signed for every $5.00 bill loaned; prompt payment and profuse thanks always being exacted in addition to the usurious one per cent.

Mr. John Johnson Griggs had also been invited to attend. He was not much of a church member, but always voted as Brother White did, and was considered the next important man in the hamlet. He traveled over the country with a wheezy horse and rickety wagon, making semi-weekly trips between Chester and the Valley, huckstering oysters in winter, truck in the fall and spring, watermelons in summer; disposing the former to the Caucasian residents, and the latter—well, Turkeytown usually took his load.

Mr. Augustus Blossom, who filled the post of barber at one of the summer hotels on the line of the railroad; Brother Peter Bangles, by profession a stone-mason's assistant, by conviction a church member, and by initiation a member of the "Ancient Order of the Children of the Firey Furnace"; Clement Jones, Josephus Frangipanni, and Charles Socrates Talliferro, all prominent members of the Turkeytown Tabernacle, completed the roll of those who responded to the Pastor's invitation. After the meeting was called to order the picture and prospectus were shown and examined. The object of the call was stated at length by Hip. After some debate Brother White proposed to start a stock

company, the capital, $25.00, to be divided into 250 shares, at a par value of ten cents each, the company to be known as the "Turkeytown Camera and Tripod Club." An organization was then perfected under the instruction of Brother White. He was to have fifty shares; Hip, twenty shares; Rev. Mr. Lamb, twenty-five shares; fifty more were divided among the brethren present, while the remaining 105 shares were to be unloaded on the church members at a premium of 100 per cent., or as Brother White called it, "one per cent." This scheme, it will be seen, made it unnecessary for any of the officers to lay out any of their own cash in the enterprise. Brother White removed the scruples of the Pastor in the matter by telling him that it was all right; "that they (the officers) were in on the ground floor." Hip seconded White by stating that was just how his boss had started the bank. After this was settled the prospectus of the "W. E. Ketchem Company" was read, and it was concluded to order an outfit as soon as the necessary amount could be collected from the prospective stockholders, or as Brother White remarked in an undertone, "as soon as the lambs could be sheared." The pastor was bidden to bring the matter before the congregation on the next Sunday, if the weather was fair, preach a special sermon, and urge his hearers to invest their savings in the enterprise, as the matter would not alone increase his income, but would prove a source of profit to all such as would give their mite towards the cause. The plan proved a success, and before three days had elapsed all of the shares were taken; and as the demand still continued, Brother White kindly accommodated a number of the sisters with some of his shares at a still higher premium. On the following Saturday evening another meeting was called, the money paid in, and the organization completed. The officers elected were: G. W. White, Esq., president and treasurer; Rev. Sampson H. Lamb, vice-president and operator; Mr. H. Leonidas Megee, secretary and developer; while Brothers Griggs, Jones, Frangipanni, and Talliferro composed the board of directors. The outfit was now ordered. It was further resolved that the pastor was to be the custodian of the camera, make the exposures, and Hip

was to be the assistant developer. The officers and directors were to have their pictures taken free of charge; the stockholders were to pay the same as any one else.

It was a gala day in Turkeytown when the outfit arrived by express, C. O. D. There was an impromptu mass meeting, the box was carried to the Parson's house, carefully opened and compared with the circular, and proved correct. A proposition was at once made to "take the crowd," but as the day was cloudy, better counsel prevailed. That night a meeting of the board was held to receive applications for pictures. They were as follows, viz.:

Sister Amanda Tribulation Brown, a large one in her new bonnet.

Brother Bangles, one of himself, "full length," in his regalia as P. G. F. of the C. of the F. F.

Sister Arabella Jones, one of her last baby, "instantaneous."

The Johnsing family, in a group like the preacher's.

Director Frangipanni stated that Farmer Wilkins wanted his two prize hogs taken, provided the price would go off of a sum Frangipanni owed him on a poultry transaction, which was refused, Brother White making the point that only cash transactions could be entertained.

(*To be continued.*)

Photographic Society's Exhibition.—The Photographic Society of Philadelphia gave an exhibition of lantern slides, the work of its members, in Association Hall, last evening. By the 191 slides shown, 51 members were represented, including Dr. Charles L. Mitchell, Alfred Clements, John Carbutt, Robert S. Redfield, John G. Bullock, Frederick Gutekunst, Julius F. Sachse, N. Parker Rolfe, William H. Rau, Edmund Stirling, George W. Ennis, Randall T. Hazzard, Theodore H. Louders, Dr. Edward H. Williams, David Pepper and George B. Wood. A running commentary on the pictures was kept up by George Vaux, Jr., who prefaced the show with a few words of introduction. The views shown comprised landscapes at home and in Europe, marines, portraits by Mr. Gutekunst; figure pieces; Venetian views, by Dr. Mitchell, and 24 Japanese scenes, by Dr. Williams.—*Public Ledger, February 21st.*

THE LATEST (LIPPMANN) PROCESS OF PHOTOGRAPHY IN COLORS.

ONCE more the daily press is teeming with accounts of the solution of the photographic color problem. This time the news hails from France, and is showered down upon the gullible pubiic with the usual *fan faronade* of modern sensational journalism. Up to the present time we have two accounts of the new process, which we reprint from the *Photographic News* of London (Feb. 13, 1891). As will be seen, the two accounts differ extremely. In the first M. Vidal, who is thoroughly conversant with all matters photographic, doubts if the problem is any nearer a practical solution. In the second account, by an unknown correspondent of the *Daily News*, it is assumed that the problem is solved. So we present both articles to our readers, which, together with our article on the "Genesis of Heliochromy," and Mr. F. E. Ives's "Photography in the Colors of Nature," gives a comprehensive view of the field of Heliochromy from the earliest experiments to the present day.

New Process of Photography in Colors.—The leading feature of the meeting of the French Photographic Society is a discovery by M. Lippmann. This scientist made a communication to the Academy of Sciences on the 2d of February, which has since caused considerable commotion. "Photography in Colors," such is the subject of this discovery. M. Janssen, president of the French Photographic Society and colleague at the Institute of M. Lippmann, brought to the meeting of the Society one of the plates shown by M. Lippmann, and, with his habitual precision, gave explanations, as complete as possible, of the phenomena serving as bases for this discovery. Let us commence by saying that M. Lippmann, after many experiments, thinks that he has succeeded in photographing luminous undulations in such a manner that the reproduction permits us to see, by reflection, red where red has fallen on the plate, yellow where yellow has acted, and so on. He appears to have succeeded in registering the interferences resulting from the meeting of rays reflected from a reflecting metallic surface and of incident rays. From this meeting there results, in the case of light, as in that of sound, intermittences of light and darkness analogous to the alternations of sound and silence. These interferences being produced in the body, or, rather, in the thickness of a sensative film, give rise to more or less numerous films after development, of which some are black, and others, corresponding to the obscurations, are white.

Now, according to the action of the rays of different color, the number of waves varying with the color, it happens that the eye perceives the color answering to each number of waves that characterize it. It is known that the length of the luminous waves is measured by millionths of millimetres. Thus the spectrum red has a wave length of 620 millionths of a millimetre. Now, supposing that the sensitive film traversed by reflected

and incident rays has a thickness of one-tenth of a millimetre, there will be called forth in this film of 100,000 millionths of a millimetre 161 waves in the one direction, and 161 in the other direction, from which there results a sort of interior stratum of black and white films superposed, corresponding to the succession of light and shade produced by interferences. In the same case, the violet, having the wave length of 423 millionths of a millimetre, produces strata of 235 black and white films, producing to the eye precisely the effect of violet light.

Experience seems to confirm this theory. M. Janssen showed a photograph of the spectrum confided to him by M. Lippmann. On examining it carefully, and making the little plate yield reflected images in different directions, we finally perceived a sort of iridescence in those parts where we were told the spectral colors existed. We only saw them very imperfectly rendered, and certainly we should never have suspected, if we had not been told of it, that it was a reproduction of the solar spectrum with the colors. Viewed as a transparency, the plate showed a reddish stain in the part corresponding to the middle of the spectrum. Theoretically, we ought to see, as a transparency, colors complementary to those seen by reflected light.

M. Lippmann operates as follows. In the first place, he covers the surface of a glass plate with a coating of albumen sensitized with iodide of silver. The plate is placed on the surface of a mercury bath arranged in a vertical camera, and the spectrum is projected upon it. The exposure lasts for from one to two hours, and the development and fixing are carried out in the usual manner. The essential precaution is to use a film as continuous as possible, as free as possible from network and granulations. Gelatino-bromide of silver emulsion is unsuitable, on account of the very marked granulations o the bromide of silver. No emulsion will serve, and it is necessary to produce the substance chemically in the material serving as the colloid layer, so as to have the most cpntinuous film possible—the least granulated that can be realized. This will be understood from what has been said above. And now what have we to conclude from this communication? I find myself absolutely embarrassed in endeavoring to form an opinion or hope in any direction. Is this a discovery conducting to photography in colors? Up to the present the principle involved is so delicate, and the results so incomplete, that I can really say nothing. I must await further and more crucial experiments before I can bring myself to believe in the possibility of finding a satisfactory solution in this direction. We do not desire to be sceptical, but we ought nevertheless to be prudent, and not to trust too readily to hopes that may very likely never be realized. It is certain that a solution, to be in the least practical, must be supported by something very different from what has been shown to me. However this may be, the fact in itself is of very great interest; it adds to our knowledge of luminous action, and the spectral embryo obtained by M. Lippmann may very well develop itself and produce a complete image of the spectrum. This is for the future to decide.

The following is from the Paris correspondent of the *Daily News*, telegraphed last Tuesday night by him to that journal, and published in its issue of last Wednesday:

Photographing in Colors.—The scientific world has been startled by the announcement made by M. Lippmann (Professor of Physics at the Sorbonne), at the last sitting of the Academy of Science, of a new process of photography discovered by him, by which colors throughout the whole range of the spectrum can be reproduced on a sensitive plate, just as accurately (since colors are but numbers of light waves) as outline or shadow are fixed by the present photographic negatives and prints. M. Lippmann's first attempts to take colored photographs have not gone beyond the experimental stage, and a long time must elapse before this branch of photography is brought to the perfection which its sister branch has attained. After a few weeks' attempts, M. Lippmann has succeeded in

photographing a stained window in colors as brilliant as the original ones. His researches, however, quite apart from the magnificent possibilities which they bring within our view, claim the regard of every scientist as an illustration of the power of the inductive method.

M. Lippmann, whom I met yesterday at his laboratory at the Sorbonne, very obligingly showed me his colored plates, and gave me an account of his discovery, drawing on a sheet of paper, as he proceeded, a number of interesting diagrams, which unfortunately cannot be sent by telegraph. The plates were all photographs of the solar spectrum. All the colors of the rainbow were there, including the infra-red and the ultra-violet, invisible to our eyes. The plates, however, had registered them and kept an impression of them, showing themselves in this respect superior to the human eye. These two mysterious colors were represented in their proper places by two distinct stripes, apparently of a jet-black color. I say apparently, because it was only our imperfect vision which made them seem so to us, their real colors, of course, being infra-red and ultra-violet. The other colors between these two—red, orange, green, blue, etc.,—were as vivid as any objects in nature.

As I was examining these plates, an assistant came to say that a colored photograph, the first of a stained window, had just been taken out of the developing bath, and was in splendid condition. The stained window, as I saw on proceeding to the dark room, was a most primitive affair, four pieces of colored glass—green, yellow, red, and blue—soldered together. "This is all we could put together," explained M. Lippmann, "but it is quite sufficient for my purpose." The plate, which was not yet fixed, was taken out of its box for a few seconds only, as this plate was precious, and we were afraid of injuring it by exposure even to candle light. To our great delight the colors were there, and rendered with photographic faithfulness. A second plate was undergoing exposure, the image of the stained glass design being thrown upon it by means of a sort of magic lantern lighted by electricity. The plate was pressed against the opening of a trough filled with mercury, which formed a mirror in contact with the plate. The rays of light pass through the sensitive film as in the old process, but on reaching the other side of the plate, instead of being absorbed by a dark background, they are sent back by the even surface of the mercury. In this mirror the whole secret lies, for apart from it the entire process is exactly the same as in ordinary photography.

Before explaining why a mirror placed on the back of a sensitive plate during exposure causes the silver precipitate to assume all the colors thrown upon it by the camera, the reader must be assumed to have a slight acquaintance with photography, and also with the laws of light, which offer a striking parallel to the laws of sound. Light, like sound, is but a form of motion. Both appear to propagate themselves by a wave-like motion, similar to the ripples on a pond when a stone is thrown in. The only difference is that, owing to friction, the waves of a pond tend to lengthen out and to disappear, whilst the waves of light or sound preserve their original length throughout their whole course. For light the wave-length—or, rather, half-wave length—is small beyond conception. It is for red light 0.0002 millimetres; for yellow light, 0.00025 millimetres; for green light, 0.0003 millimetres. In other words, there are 5,000 waves of yellow light to an inch, etc. A curious property of sound or light waves is that, when they meet another wave of equal length coming in an opposite direction, the conflicting waves overlap each other, the continuity is broken, and a succession of dark and light, or silent and loud, intervals is produced. A French physician of the beginning of this century, Napoleon Savart, was the discoverer of the phenomenon called interference of sound. If the ear is placed at a short distance off a sounding or echoing plate, and gradually drawn away, it will be observed that the sound alternately dies away and comes back with two-fold intensity. The explanation of this is that the waves of sound, the direct and reflex waves, alternately neutralize and reinforce each other. The two conflicting waves of sound or of light might be represented by the two serpents of Mercury's rod, which form a dot at their intersection, and a wide space between each dot. Each is a wavy but continuous

line, whilst the two combined give a sort of broken line or chain. It was Newton who discovered the interference of light, and was able to measure the wave-length of different colors.

Some time ago it occurred to M. Lippmann that if, instead of a continuous wave of light crossing the photographic plate, a broken line (produced by "interference") were sent across it, the silver, instead of being precipitated in one mass throughout the gelatino-bromide, would settle in layers (about the thickness of a soap bubble). By placing a looking-glass behind the plate, the red light, for instance, caused the silver to be deposited in layers of half the thickness of a red wave length. Blue light would cause the layers to be somewhat thicker wherever it passed, but these layers coinciding exactly as they do with the length of a wave of light, can only let pass the same light which originated them. This is the whole principle of M. Lippmann's remarkable discovery, and practice shows that it will work in the case of the solar spectrum and of stained windows. Whether it may be applied to landscapes or portraits the future alone can tell; but there is nothing unreasonable in the hope that it will be so.

CEREUS *vs.* CACTI.

PROVIDENCE, Feb. 11th, 1891.

To the Editor of the American Journal of Photography:

DEAR SIR:—In connection with the Night-Blooming Cereus spoken of in January number, *of course I know that my pictures should also have carried its scientific name*, and though many might not have seen its significance, it would have prevented any misunderstanding.

I would ask if you will kindly publish the enclosed, which explains some of the differences, or rather similarity, of these genera of Cacti and varieties of Cereus. Yours truly,

R. CLINTON FULLER.

To the Editor of the American Journal of Photography:

The January number of your magazine contained a criticism of the Night-Blooming Cereus used by Mr. Adams in illustrating his paper on Flash-Light Photography, in *Outing*, which I think is misleading, particularly to those photographers who are not expert botanists. As the photograph was from one of my own negatives it may not be out of place for me to call attention to the subject.

The common names given to many of the plants of the Cactus family furnish nothing regarding their botanical classification.

Of the many divisions of this family, the Cereus and Phyllocactus genera contain several varieties with the remarkable feature of flowering at night. The genus Cereus takes its name from the form of the stem of some species, like a wax taper or candle, and covers a very large number of species, not by any means all night-blooming. The commonest red-flowered Cactus is *Cereus speciosissimus;* what is called

Old Man Castus is *Cereus senilis;* also the rat-tailed Cactus is, botanically, *Cereus flagelliformis;* and all these flower during the day in their various colors, some fading at night, others lasting more than one day. Then the vine that Mr. Grant photographed in St. Helena, although flowering at night, he says is called "locally Cactus and Madagascar Creeper, but the botanical name is *Cereus triangularis.*" Among the others that flower at night are the *Cereus nycticullus*, bearing a straw-colored blossom; the *Cereus macdonaldie*, with its large yellowish flower, which was the species from which pictures were made illustrating your paper; the beautiful wine-red *Cereus rostratus;* and, of course, the elegant pure white *Cereus grandiflorus*, from the Miter Mountains, Mexico, and called "the true Night-Blooming Cereus."

The genus Phyllocactus, to which the flower that I photographed belongs, is so called on account of the flat stem or leaf, and is native to South America, This variety possesses the wonderful feature of some of the Cereus of blooming at night, with its large flower of pure white, having a sweet odor, expanding in the same way, reaching its full beauty between 10 and 12 o'clock, and fading in the morning. From its strong resemblance in flower this plant has come to be called "Night-Blooming Cereus" generally, and is no doubt more often seen in flower as such, than the *grandiflorus* itself.

Now, as the picture was not displayed as a photograph of a botanical specimen in a scientific sense, but merely as a flash-light of a subject hitherto photographed with difficulty, it would seem to border on pedantry, in any than a botanical review, to assume that the omission of the exact botanical name makes the title false. As well might a picture of Callas and named Easter Lilies, be called a "photographic fraud" because it did not represent the particular variety of Bermuda Lily now commonly understood as the Easter Lily.

Your article leaves the impression that a common Cactus was photographed, and palmed off as an achievement of flash-light work, as though it were less difficult to photograph this *Phyllocactus phyllanthus*, a Night-Blooming Cactus, than it was the *Cereus macdonaldie*, also a Night-Blooming Cactus.

As May, 1888, was the date your pictures were taken, I would say that Mr. Adams now has prints from two of my negatives made Sept. 10, 1887, the illumination being by magnesium wire, and I find at least one other member of the Providence Camera Club had made negatives of this beautiful flower in this way as early as 1884, showing that the idea was thought of among the amateurs here some time ago.

Providence, R. I., Feb. 11, 1891. R. CLINTON FULLER.

[With pleasure we publish the above communications from Mr. R. Clinton Fuller, of the Providence Camera Club. In our criticism we did not for a moment wish to reflect on Mr. Fuller; to the contrary, we gave nothing but praise to the negative (*vide* AM. JOUR. OF PHOTO., Vol. XI., p. 148; Vol. XII., p. 34). But it was the repeated publication of the picture by others at home and abroad, with its misleading superscription, to which we objected, a matter, though small in itself, which should not have occurred in the first place, as it is not a Cereus. As will be seen by reference to Mr. Fuller's note, he agrees with us that his picture should *also* have carried its scientific name—*i.e.*, its proper name—in the first place.

As to the statement that it was no less difficult to photograph this Cactus than the *Cereus macdonaldi*, we beg to differ, and will state that there is no comparison between the two subjects. Mr. Fuller's Cactus is a pot plant, which can be shifted or placed in any favorable position, after which almost any one who has a knowledge of photography can get a fair negative. The *Cereus macdonaldi*, on the controry, is a running vine or creeper, which has to be trained up along the rafters of the greenhouse, and cannot be shifted into any position at will,—a material difference, of which probably Mr. Fuller was not aware.

As this journal is not a "botanical review," we forbear entering into any criticism of that feature of the paper, except to state that in our humble opinion the writer is a much better photographer than botanist.

As to the claim of similar negatives having been made in 1887, and by others as early as 1884, we do not wish to be understood as doubting this statement for a moment, as this is an epoch of surprises. For instance, by a strange coincidence, we print on another page of the JOURNAL a notice of a lense, now in the British Museum, unearthed by Layard at Nineveh, and dating back centuries B. C.

In this present age we have to be prepared for anything, consequently we should not even be startled if some fine morning the daily papers would teem with accounts of the discovery of some ancient tomb, say in the vicinity of Thebes, dating back to the twelfth dynasty (2300 B. C.), wherein, beside the sarcophagus of some Amenemha of old, among the mummified Ibis and Sacred Cats, were found an amateur photographic outfit, with roll-holder and flexible films complete, together with papyrus containing specimen prints of the Sacred Lotus taken by Blitz-Pulver,—which might even antedate the photographic floral experiments of our Providence brethren. *Selah!*—ED.]

THE DAGUERRE MONUMENT.

The Journal d l' Industrie Photographique reproduces a process cut of the monument lately erected in Washington. In connection with this illutration it states: "The design is, to be sure, heavy and incongruous. However, this is of little consequence. The committee at Washington deserve our gratitude none the less. We have but to look at the incentive and object, not the result."

It is a curious fact that originally Daguerre did not attach great value to his discovery, but held it secondary to his method of dioramic painting, an oppnion which was shared by many others, among whom were not a few French scientists high in authority. Before the pension was granted him by the Chamber of Deputies, June 15, 1839, it was especially stipulated that the secret of the diorama should be included as one most desirable to be known.

This was done before the agreement was signed, and accounts for the pension being unequal, viz., Daguerre 6000, Niepce 4000 francs.

Daguerre himself considered the diorama his principal subject, which was then being exhibited to large and mystified audiences. These pictures were printed on both sides of a transparent canvas, and were exhibited by reflected and refracted light, at intervals of a few minutes, in such a manner that the alternate effects of night and day gradually came over them.

His most successful effort in this branch of art was known as the "Midnight Mass," the first effect of which shown, by reflected light, showed a cathedral with empty seats and dismantled altars, the light streaming in through the long, narrow windows in all the colors of the spectrum. The second effect, by substituting refracted for reflected light, changed all this in an instant. The large cathedral appeared filled with worshipers, while the altar, now blazing with numberless lights, was seen surrounded with scores of clergy and acolytes.

A similar realistic effect was the Valley of Goldau. At first the beholder saw a smiling Swiss valley, basking in the summer sun as it were, cattle grazing on the hillsides, where nestled the picturesque cottage of the Swiss peasant. In an instant this scene of peace and quietness vanished, and in its place appeared a scene of desolation, with its rocks and boulders tumbling down from the mountain, crushing houses, people, and cattle, all in an undistinguishable mass, the finale being a dreary desert where a few moments before had appeared a

smiling and happy scene. In fact, the diorama was a realistic representation of the disastrous landslide of September 2d, 1806, in which four villages, one hundred and ten houses, and two hundred and twenty barns, were wiped out of existence without a moment's notice, causing a loss of four hundred and fifty-seven lives, a disaster second in magnitude only to the Lisbon earthquake and the Johnstown flood of later date.

Daguerre also painted several others of minor importance, such as "The Temple of Solomon" and the "Cathedral of Sainté Marie de Montreal."

This process, from which Daguerre expected so much, has long since been forgotten but few of the present generation of photographers even knowing that such a thing as the diorama ever existed; while the other discovery with which his name is associated has proved a living monument for ages to come. J. F. Sachse.

OUR ILLUSTRATIONS.

FOR our frontispiece we use a series of negatives by Mr. Gilbert Cope, of West Chester, Pa., showing the effects of the great ice storm during January last, which caused so great havoc with out fruit and shade trees.

Our extra illustration is a specimen photogravure by Geo. F. Lewis & Son, of Philadelphia. The original negative was made by Henry Schreiber in the open air without any gallery appliances, the object in view being to obtain a portrait with all the anatomy and modeling of the original, as an aid to an artist in painting a portrait. The negative was developed and the photogravure made without any retouching whatever. The specimen forms a pleasing contrast to the worked-up portraits usually seen at the present day.

The London Camera Club Photographic Conference, 1891.—The 1891 conference will be held in the theatre of the Society of Arts (by kind permission of the council), on Tuesday and Wednesday, April 7th and 8th, under the presidency of Captain W. de W. Abney, C.B., R.E., D.C.L., F.R.S. A complete programme will be issued later and distributed. All photographers are cordially invited to attend and take part in the discussions at the Society of Arts.

GENERAL NOTES.

Labeling Bottles for Use in Dark Room.—Our British contemporary, in a late issue, gives the following valuable hints upon this subject: In dark rooms, as so frequently now illuminated, the method of labeling the various bottles in use is a matter of some importance, the method best combining ease in making and legibility being, perhaps, that in which black varnish is employed, the letters being either written with a camel-hair pencil, or scraped out of an opaque square of black previously painted on, and well dried by baking. Letters so painted, though not indestructible, are very permanent. If the ordinary white label be preferred, it should, for bottles requiring much handling, be varnished with copal varnish, the kind purchasable under the name of "oak varnish" being suitable for the purpose. But before applying a varnish the label should be first sized. The glue or paste employed for mounting prints will be all that is necessary; a thin coat should be laid on, the label dried, and then the varnish applied. Varnishing without sizing will produce a greasy-looking appearance.

Messrs. Merk & Kreitner, of Berlin, have patented a method of etching which also should be suitable for such purposes as we allude to. Their solution is made of, first, ten grains of pure fluoride of ammonium, half a grain of common salt, and half a gram of carbonate of soda, well pounded in a mortar, and mixed in a bottle with four grams of concentrated, fuming hydrofluoric acid and two grams of strong sulphuric acid, the whole being well shaken. Next, there is dissolved, in a separate vessel made of lead, half a gram of fluoride of potassium in one gram of ordinary muriatic acid, the heat of a water bath being necessary. To use the liquids, a gram of the latter mixture is added to the first described, the bottle well shaken, and two drops of silicate of soda solution and one of spirits of sal ammoniac added completes the mixture. It may be used with a quill, or laid on with an India-rubber stamp, just as the ordinary coal-tar color inks are used; but in lieu of a woven fabric pad, one covered with India rubber should be used.

A camera taking fifty (?) photographs per second has been presented to the French Academy of Science. Whilst photographing two men fencing, one was disarmed, and during the time the foil was falling to the floor, it was photographed eight times.

A New Use for Photography.—"I had an experience the other day which has interested me more than anything of a similar nature which has happened to me in all my business experience. A young lady who moves in the best society brought me three letters and I photographed them for her, and at her request destroyed the negatives. The letters were the most tender and ardent love missives imaginable. They were addressed to the young lady herself, and were signed by a name which I am sure you would recognize instantly were I to mention it. I will confess that curiosity got the better of my judgment, and I finally said:

"'You'll pardon me, but this job is a little unusual, isn't it?'

"'Is it?' she said, smiling.

"'It strikes me so,' I replied. 'I don't see why you want photographs of those letters since you have the letters themselves.'

"'Don't you? Well, I do. Suppose the letters were to be lost, or burned, or destroyed in some other way?'

"'Wouldn't the photographs be destroyed just as easily as the letters?'

"'Perhaps not; especially if they were not kept in the same place with the letters. But I'm not afraid of losing them by fire or in any such way as that. The fact is, the ink is fading out, and in a short time it is likely to be illegible.'

"There is a girl for you who doesn't propose to take any chances in the breach of promise business."—*Chicago Mail.*

To Transfer Photographs.—To transfer a print to wood, metal, glass, or even porcelain, it suffices to well clean the object if it is already polished, and to polish it in the contrary case, and then to spread over the surface a light coating of copal varnish. Then apply the toned and fixed print, still wet, and with a squeegee or printer's roller drive away the air-bubbles and the excess of varnish; allow to dry for three or four hours. Then rubbing gently with a slightly wet sponge, gradually remove the paper, the albumen film containing the image remaining attached to the glass by the varnish. A second coating of varnish will consolidate the whole. The only defect in this process is that it reverses the images. Those who operate on pellicle, or who practice phototypy, and detach the gelatine pellicles, can make a reversed print which, in this case, the process will correct. In this way it is possible to make very beautiful slides for the lantern, which are then to be painted for this particular application. Engravings may also be transferred in the same manner.—*Les Annales Photographiques.*

Halation.—A. & L. Lumière show, in the *Bulletin Belge*, that part of the halo is due to diffusion of light in the sensitive film, and part to the passage of luminous rays through the film. By covering the sensitive plate with a screen, pierced with an opening exactly the size of the luminous image, it was found that the halo formed was so small that it might be ignored. When, however, the film was protected from the image by a black screen the exact size of it, an ordinary halo was obtained. Consequently the authors conclude that the halo is due to two causes,—the support and the lens. From a study of the influence of the support, the authors find that the halo disappears entirely when the illuminated portion of the film exceeds a certain limit, depending upon the index of refraction of the supporting medium, and upon its thickness. The lens also assists in the production of the halo. When the lenses are clean and well polished it is at its minimum, but a layer of dust augments it considerably.

Belitzki's Durable Reducer.—This reducer is prepared by dissolving in the order given

Ferric potassic oxalate	10 grams.
Sodium sulphite (neutral)	8 "
Oxalic acid	2½ to 8 "
Sodium hyposulphite solution (1 : 4)	50 "
Water	200 "

This solution keeps well in the dark, and may be used at once after fixing.

An Intensifier Without a Virulent Poison.—To those amateurs desirous of using an intensifier of a non-poisonous nature the following may be of service: Soak the negative in water till soft, then drain and immerse in a bath of

Ammonia	30 c.c.
Water	30 c.c.

for a minute and a half, and then place in the following:

Cadmium bromide	1 gram.
Methylated alcohol	1000 c.c.

till sufficiently intensified.—*The Amateur Photographer.*

The Earliest Lens.—The earliest-known lens is one made of rock crystal, unearthed by Layard at Ninevah. This lens, the age of which is to be measured by thousands of years, now lies in the British Museum, with its surface as bright as when it left the maker's hands. By the side of it are very recent specimens of lenses which have been ruined by exposure to London fog and smoke.—*Chicago Tribune.*

In the Twilight Hour.

AN ARAB SAYING.

Remember, three things come not back:
The arrow sent upon its track,—
It will not swerve; it will not stay
Its speed; it flies to wound or stay.

The spoken word, so soon forgot
By thee; but it has perished not;
In other hearts 'tis living still,
And doing work for good or ill.

And the lost opportunity,
That cometh back no more to thee.
In vain thou weepest, in vain dost yearn,—
Those three will nevermore return.

—*Constantina E. Brooks.*

THE sight of embodied goodness makes us want to be good.

THERE are saints enough, if we only knew how to find them.—*Phillips Brooks.*

THAT man shall be immortal who liveth until stoned by another without fault.—*Anon.*

IT IS the crushed grape that gives out the blood-red wine. It is the suffering soul that breathes the sweetest melodies.—*Gail Hamilton.*

A MORE glorious victory cannot be gained over another man than this, that when the injury began on his part the kindness should begin on yours.—*Tillotson.*

LIFE without reverence would be a poor thing. If reverence is dying out of popular thought, the sorrow of our situation is beyond words to describe. Reverence in its last analysis is the uplifting of the soul to that which is above it.—*John W. Chadwick.*

THE Golden Rule by itself is far from being an adequate guide of life. It requires as its complement a true idea of man as he ought to be. We must know in what well doing consists. What ought we to desire at the hands of others?—*Professor Fisher.*

No signs of mourning or words of praise for a person, after death, can atone for, or make people forget, the unkind and uncharitable speeches made concerning that person while alive. Charity towards the living, not the dead, is the greatest of Christian graces.—*J. Max Hark, D.D.*

SOMETIMES a fog will settle over a vessel's deck, yet leave the topmast clear. Then the sailor goes up aloft and gets a lookout which the helmsman on deck cannot get. So prayer sends the soul aloft; lifts the clouds in which our selfishness and egotism befog us, and gives a chance to see which way to steer.

A GOOD BOOK, whether a novel or not, is one that leaves you farther on than where you took it up. If, when you drop it, it drops you down in the same old spot, with no finer outlook, no clearer vision, no stimulated desires for that which is better and higher, it is in no sense a good book.—*Anna Warner.*

THE remote effect of being true should have a place in our thoughts. The future is built on the present. Noble living projects itself into the future. It comes out in the power of children and children's children. Its widening and deepening influence goes out through the gates of the present into the ever-deepening channels of the future.—*J. E. Fulton.*

I REMEMBER hearing, years ago, of an old merchant who on his deathbed divided the results of long years of labor, some hundreds of pounds in all, among his sons. "It's little enough, my boys," were his last words, "but there isn't a dirty shilling in the whole of it." His ideal had not been to make money, but to keep clean hands.—*Thomas Hughes.*

CHOICE is the supreme prerogative of the moral creation as distinguished from the material, and a mighty prerogative it is. The hugest orb in space cannot choose to loiter an instant in its swift rush, or to swerve a hair's-breadth from its orbit, but the little babe who has just learned to say "mamma" can overturn the throne of God in his own little bosom.—*George D. Boardman.*

IF amid the glories of the world in which we live you can read no lesson written by an invisible hand, if amid the whispered melodies of evening zephyrs, or the choral harmonies which fill the great temple of creation, you recognize no message from Him whose omnipotent presence animates the universe,—do not boast of it. It is the proof of your dullness of heart.—*J. B. Hawthorne.*

Literary and Business Notes.

OUR valued contributor, Julius F. Sachse, Esq., has just completed in the *Pennsylvania Magazine of History and Biography* a valuable contribution to the local history of our (Lancaster) county in his "Registers of the Ephrata Community." It consists of a list, fuller and more complete by far than any before published or even deemed possible, of "*the Brothers and Sisters who in and without Ephrata Community died*," from 1728 to 1811. The list contains three hundred and seventy-seven names belonging to the secular congregation at large. A second register is that of the Monastic Brotherhood, and a third that of the Sisterhood of *Spiritual Virgins*. The compiler has given in his copious and valuable notes the secular names of all as far as known, with biographical notes concerning most of them, derived from some of the unique and rare Ephrata prints and manuscripts in his possession, of which he has one of the fullest and most valuable collections in existence. He has reprinted the "Registers" in pamphlet form, with a beautiful picture of the "Old God's-Acre at Ephrata," reproduced from a negative taken by Mr. Sachse himself, for he is a photographer as well, and a frequent contributor to the AMERICAN JOURNAL OF PHOTOGRAPHY. Our readers will be glad to know that another article from his pen will appear in *Christian Culture* at no far distant date.

—*Christian Culture for Feb., 1891.*

MR. W. H. ROBERTS, of Moorestown, N. J., has succeeded in making a good negative of his residence by moonlight. This negative is perfect in the detail, except the shadows under the porch. It was made with a hand camera, Darlot lens, full opening; exposure 1 hour, developer pyro and potash, plate Cramer 35.

PAINTINGS IN OIL, by M. Louise McLaughlin. Robert Clarke & Co., Cincinnati, Ohio. A practical manual for the use of students; will be noticed at length in our next number.

WE are in receipt of several fine specimen "Cellugraphs" from Mr. John Carbut, printed from negatives made in celluloid films while abroad last summer. The subjects of the pictures are the ruins of St. Mary's Abbey, York, Eng., and an interior of Carlisle Cathedral, showing the east window. They well illustrate the beauty of this new candidate for public favor. For amateurs who wish to obtain specimen prints of their negatives these new positive films will fill a long-felt want.

RECEIVED just as we are going to press, —Geschichte der Photographie, Von C. Schiendl. A Hartleben, Vienna, Pest, Leipzig. This work will be reviewed at length in our next number.

PICTURES IN BLACK AND WHITE, by Geo. Mason ("Mark Oute"). E. & H. T. Anthony & Co., New York; No. 24 of the Anthony Series. A good book for dull days when spirits are low.

WE are in receipt of a framed copy of the *Photographic Times* dial calendar for 1891. It does credit to the publishers, and forms a valued addition to the walls of our editorial den.

THE VOICE IN SPEECH AND SONG; Theodore E. Schmauk. John B. Alden, New York. A view of the human voice for speakers and singers, and all who love the arts of speech and song. A book which should have a place in every library and refined home. The clean pages, choice language, polished diction, and thorough handling of the subject are rarely to be found combined in one volume. The scholarly author has surpassed his previous efforts in the present volume.

THE account of the demonstration, Jan. 19th, 1891, by G. D. Melburn, before the California Camera Club, is unfortunately crowded out for want of space. The main feature of the evening was a Blitz-Pulver negative of the audience with a No. 2 Kodak, making a slide from said flash negative, and showing the audience their own picture upon the screen. We are in receipt of a print from the negative, with compliments of the Eastman Company.

WE acknowledge receipt of Catalogue of Exhibition of 1891 of the Camera Club of Hartford, Conn. It is handsomely gotten up, and does credit to the club.

WE would call attention to our advertising columns—they are open to all respectable dealers and manufacturers. As an advertising medium for anything relating to matters photographic, the AMERICAN JOURNAL OF PHOTOGRAPHY is second to none.

Queries and Answers.

Belinda Smith, Kankakee, W. Va.—The prints sent us give promise of success in the future. Subscribe for the AMERICAN JOURNAL OF PHOTOGRAPHY. It will give you many useful hints during the year.

Henry T——, Manayunk, Pa.—Prints received. Camera was not level. Try again; but in the future focus sharper, unless you want to join the *naturalistic school*. Take a little more time. Be sure you are right before you go ahead.

Anxious Inquirer.—Subscribe to the AMERICAN JOURNAL OF PHOTOGRAPHY.

Pennywise, Nickelville, N. Y.—We can and will not stop the JOURNAL as you request us to do. Perhaps you mean to stop your subscription. If that is your intent, we are satisfied, but would suggest that it would be a little more honorable on your part if you had first paid up last year's subscription.

Eoside.—We are not advertising anything in this department, no matter how ingenuous you word your query. See our rates on inside cover, and act accordingly, or send your query to some journal that only answers *bona fide* inquirers.

RECENT PATENTS.

THE following list of patents relating to the photographic interests is specially reported by Franklin H. Hough, Solicitor of American and Foreign Patents, No. 929 F Street, N. W., Washington, D. C.

ISSUE OF FEBRUARY 3D, 1891.

445,561—Camera Attachment; C. L. Knox, assignor of one-half to N. Cohn, Nashville, Tenn.

445,639—Photographic Cabinet; O. M. Herburg, Hendrum, Minn.

445,911—Photographic Apparatus; E. V. Swinden and J. Earp, Liverpool, England.

445,804—Photographic Background; W. G. Entreken, Philadelphia, Pa.

445,550—Photographic Camera; W. G. Fuller, assignor to Scovel & Adams Co., New York.

445,861—Photographic Plate-Holders, Negative and Stock Cabinet; G. H. Richards, assignor of one-half to W. Nuneviller, Philadelphia, Pa.

445,581—Photographic Printing Apparatus; R. J. Winkoop and J. M. Kemp, Paterson, N. J.

ISSUE OF FEBRUARY 10TH, 1891.

446,045—Photographic Camera; F. Whitney, Chicago, Ill.

446,368—Photographic Camera; C. Whitney, Chicago, Ill.

446,369—Photographic Camera; C. Whitney, Chicago, Ill.

446,372—Photographic Camera; C. Whitney, Chicago, Ill.

446,374—Photographic Camera; C. Whitney, Chicago, Ill.

446,373—Photographic Cameras, Supply Case for Roll-Holders; C. Whitney, Chicago, Ill.

ISSUE OF FEBRUARY 17TH, 1891.

446,529—Photographic Shutter; G. W. Lowe and Wm. Shakespear, Jr., Kalamazoo, Mich.

ISSUE OF FEBRUARY 24TH, 1891.

446,880—Photographic Shutter; H. B. Norton, Minneapolis, Minn.